(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号

特開平10－196643

(43)公開日　平成10年(1998)７月31日

(51)Int.Cl.[6]	識別記号	ＦＩ	
Ｆ１６Ｃ　17/04		Ｆ１６Ｃ　17/04	Ａ
17/10		17/10	Ａ

審査請求　未請求　請求項の数３　ＯＬ　（全４頁）

(21)出願番号　特願平9－180

(22)出願日　平成９年(1997)１月６日

(71)出願人　000001247
光洋精工株式会社
大阪府大阪市中央区南船場３丁目５番８号

(72)発明者　高橋　毅
大阪府大阪市中央区南船場三丁目５番８号
光洋精工株式会社内

(74)代理人　弁理士　青山　葆　（外１名）

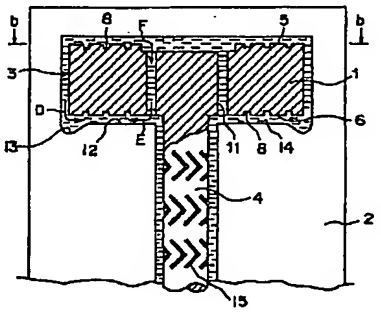
(54)【発明の名称】　密閉形スラスト動圧軸受

(57)【要約】

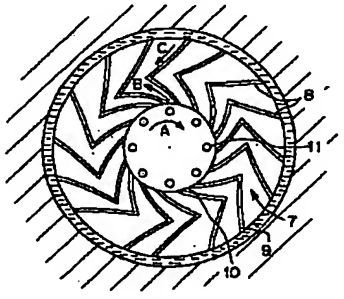
【課題】　起動時に軸方向に支持する動圧を十分に発生することができ、端面等を損傷することがない密閉形スラスト動圧軸受を提供する。

【解決手段】　ハウジング２内に回転体３のフランジ１を密封状態で収納する。上記フランジ１の上下両端面５，６にＶ字形の動圧発生溝８を設けると共に、上記フランジ１には動圧発生溝８より径方向内側に軸方向に貫通する複数の孔１１を設ける。また、上記孔１１の断面積の総和が環状領域７面積の少なくとも１／３０とする。さらに、上記フランジ１の下側の端面６に対向するハウジング２の受面１２には油溜まり１３を設ける。

(a)



(b)



1

【特許請求の範囲】

【請求項１】　軸体とこの軸体の一端に設けられたフランジとから成る回転体と、この回転体のフランジを密閉状態で収納するハウジングとを備え、上記フランジの端面またはこの端面に対向する上記ハウジングの受面に動圧発生溝が設けられている密閉形スラスト動圧軸受において、

上記フランジは、上記動圧発生溝が設けられた環状領域よりも径方向内側に軸方向に貫通する少なくとも１つの孔を備えていることを特徴とする密閉形スラスト動圧軸受。

【請求項２】　請求項１に記載の密閉形スラスト動圧軸受において、上記孔の断面積の総和が上記環状領域の少なくとも１／３０であることを特徴とする密閉形スラスト動圧軸受。

【請求項３】　請求項１または２に記載の密閉形スラスト動圧軸受において、上記フランジの端面に対向するハウジングの受面に、上記環状領域に少なくとも部分的に対向あるいは重なる油溜まりを備えていることを特徴とする密閉形スラスト動圧軸受。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、密閉形スラスト動圧軸受に関する。

【０００２】

【従来の技術】従来、密閉形スラスト動圧軸受としては、軸体とこの軸体の一端に設けられたフランジとから成る回転体と、この回転体のフランジを密閉状態で収納するハウジングとを備え、上記フランジの軸方向両端面に動圧発生溝を設けたものがある。

【０００３】

【発明が解決しようとする課題】ところで、上記従来の密閉形スラスト動圧軸受では、上記回転体が鉛直方向に設置された場合、起動前に上記回転体が重力によって降下し、フランジの下側の端面とそれに対向するハウジングの受面は接触した状態あるいは極めて薄い作動流体の膜しか存在しない状態になっている。この状態で、回転体を起動させると、フランジの軸方向両端面で同時にたとえばＶ字形の動圧発生溝が作動流体をこの溝の半径方向中央に引き込もうとするが、ハウジングがフランジを密閉状態で収納しているため、フランジの上側の端面とハウジングとの間に負圧が発生し、もともと極めて少量しか作動流体が存在しないハウジングの受面とフランジの下側の端面との間に、特に半径方向内側の部分に十分に作動流体を導くことができないという問題があった。そのため、回転体の起動時に、フランジの下側の端面と受面との間に作動流体が不足した状態となって、フランジを支持する動圧を十分に発生させることが出来ず、スラスト動圧軸受としての機能が果たせず、また、フランジの端面等を損傷するという問題があった。

2

【０００４】そこで、本発明の目的は、起動時に軸方向に支持する動圧を十分に発生することができ、端面等を損傷することがない密閉形スラスト動圧軸受を提供することにある。

【０００５】

【課題を解決するための手段】上記目的を達成するため、請求項１の密閉形スラスト動圧軸受は、軸体とこの軸体の一端に設けられたフランジとから成る回転体と、この回転体のフランジを密閉状態で収納するハウジングとを備え、上記フランジの端面またはこの端面に対向する上記ハウジングの受面に動圧発生溝が設けられている密閉形スラスト動圧軸受において、上記フランジは、上記動圧発生溝が設けられた環状領域よりも径方向内側に軸方向に貫通する少なくとも１つの孔を備えているを特徴としている。

【０００６】請求項１の密閉形スラスト動圧軸受によれば、回転体の軸が鉛直状態で回転体が回転すると、上記フランジの上側の端面とハウジングの受面との間の作動流体が、上記フランジを貫通する孔を通ってフランジの下側の端面とハウジングの受面との間に補給されるので、動圧発生溝に十分な作動流体を供給できる。したがって、フランジの軸方向の支持を行う動圧が十分に発生して、スラスト動圧軸受としての機能を果たすことができ、また、フランジの下側の端面とそれに対向するハウジングの受面とが損傷することがない。

【０００７】請求項２の密閉形スラスト動圧軸受は、請求項１に記載の密閉形スラスト動圧軸受において、上記孔の断面積の総和が上記環状領域の少なくとも１／３０であることを特徴としている。

【０００８】請求項２の密閉形スラスト動圧軸受では、上記孔の断面積の総和が上記環状領域の少なくとも１／３０あるから、所定回転数で十分な作動流体がフランジの下側の端面に供給されて、十分な動圧が生じる。このことは、実験により確かめられた。

【０００９】請求項３の密閉形スラスト動圧軸受は、請求項１または２に記載の密閉形スラスト動圧軸受において、上記フランジの端面に対向するハウジングの受面に、上記環状領域に少なくとも部分的に対向あるいは重なる油溜まりを備えていることを特徴としている。

【００１０】請求項３の密閉形スラスト動圧軸受によれば、上記フランジの端面に対向するハウジングの受面に、上記環状領域に少なくとも部分的に対向あるいは重なる油溜まりを備えているから、回転体起動時におけるフランジの下側の端面への作動流体の供給はこの油溜まりからも行なわれ、動圧発生溝による動圧の発生がより確実に行なわれる。

【００１１】

【発明の実施の形態】以下、本発明を図示の実施の形態により詳細に説明する。

【００１２】図１(a)は、本発明の一実施の形態の断面

図である。但し、ハウジング２については、見やすくするために、ハッチングを省略している。

【００１３】図１(a)に示すように、回転体３は軸体４とその端に固定したフランジ１から成る。上記軸体４およびフランジ１はハウジング２によってラジアルおよびアキシャル方向に支持している。上記フランジ１はハウジング２内に密封状態に収容している。上記フランジ１の上下両側の端面５,６には、図１(a),(b)に示すように、環状領域７にＶ字形の動圧発生溝８を設けている。この環状領域７は、図１(b)では、円９と円１０との間の領域である。

【００１４】また、上記フランジ１の環状領域７よりも半径方向内側には、８個の貫通孔１１を円周上に等間隔で設けている。この貫通孔１１の断面積の総和は、環状領域７の面積の１／３０以上になっている。

【００１５】一方、上記フランジ１の下側の端面６と対向する受面１２には、上記環状領域７に部分的に対向する複数の油溜まり１３を設けている。この油溜まり１３は作動流体１４が動圧発生溝側８に出て行きやすいように、半径方向内側が滑らかに湾曲している。

【００１６】一方、上記軸体４には動圧発生溝１５を設けて、軸体４を動圧によってラジアル方向に支持している。

【００１７】上記構成の密閉形スラスト動圧軸受の回転体３が鉛直方向に設置された場合、起動前には上記フランジ１は自重によって降下し、フランジ１の下側の端面６とそれに対向するハウジング２の受面１２は接触した状態あるいは極めて薄い作動流体１４の膜しか存在しない状態になる。この状態で、回転体３を起動させると、Ｖ字形の動圧発生溝８が作動流体１４をこの溝８の半径方向中央に引き込もうとする。このとき、環状領域７よりも径方向内側においてフランジ１を貫通する孔1.1によって、フランジ１の上側の端面５とハウジング２の受面１２との間の空間と、フランジ１の下側の端面６とハウジング２の受面１２との間の空間とが連通している。そのため、作動流体１４が、上記孔１１を通って図１(a)の矢印Ｅ,Ｆが示すように流れて、フランジ１の下側の端面６とハウジング２の受面１２との間に作動流体１４が補給される。このため、ハウジング２がフランジ１を密閉状態で収納していても、フランジ１の上側の端面８とハウジング２との間に負圧が発生しない。このため、ハウジング２の受面１２とフランジ１の下側の端面６との間に、矢印Ｄ,Ｅ,Ｆに示すように、特に半径方向内側の部分に十分に作動流体１４を補給して、起動時から動圧を発生させることができる。

【００１８】このように、回転体３の起動時に、フランジ１の下側の端面６の環状領域７に作動流体１４が十分に補給されるので、動圧発生溝８の設けらた環状領域７にフランジ１を軸方向に支持する動圧を十分に発生させることができ、スラスト動圧軸受としての機能を果たすことができる。

【００１９】また、上記油溜まり１３から、フランジ１の動圧発生溝６は、作動流体１４を引っ張り込む。すなわち、フランジ１の回転時に、上記動圧発生溝８が動圧発生溝８直下の油溜まり１３から作動流体１４を引っ張り込むので、上記油溜まり１３がない場合に比較して、作動流体１４はフランジ１の下側の端面６とハウジング２の受面１２との間に一層容易に補給される。

【００２０】図２は作動流体１４を循環させるための全ての孔１１の面積の総和と環状領域７の面積との比に対する回転体３の浮上量の関係を示す。詳しくは、図２は回転体３の回転数を１０００r.p.m.、３０００r.p.m.、５０００r.p.m.と変化させた場合に、作動流体１４用の全ての孔１１の総面積と環状領域７の面積との比に対する回転体３の浮上量の関係を示す図である。上記孔１１の総面積と環状領域７の面積との比が１／３０以上であれば、回転体３の回転数が１０００r.p.m.、３０００r.p.m.、５０００r.p.m.と変化した場合、回転体３の浮上量は、それぞれ約５μm、５.５μm、６μmとなって設定浮上量５μm以上になる。したがって、フランジ１を貫通する作動流体１４用の孔１１の面積の総和と環状領域７の面積に対する比が１／３０以上であり、回転体３の回転数が１０００r.p.m.以上であると、回転体３は設定浮上量である５μm以上を確保することができる。

【００２１】なお、上記実施の形態では、動圧発生溝８はフランジ１の上下側の端面５,６に設けられているが、動圧発生溝を上記端面に対向するハウジングの受面に設けてもよい。

【００２２】また、油溜まりは、図示しないが、このフランジの端面に設けてもよい。この油溜まりは、動圧発生溝のある環状領域に対向するようにしてもよいし、あるいは、この環状領域に部分的に重なってもよい。また、実施の形態では、油溜まり１３はハウジング２の受面１２の外周部分に複数設けられているが、ハウジング受面の内周部分に設けてもよい。また、油溜まりの形状は、丸穴、円弧形あるいはリング形であってもよい。

【００２３】

【発明の効果】以上より明らかなように、請求項１の動圧軸受は、軸体とこの軸体の一端に設けられたフランジとから成る回転体と、この回転体のフランジを密閉状態で収納するハウジングとを備え、上記フランジの端面またはこの端面に対向する上記ハウジングの受面に動圧発生溝が設けられている密閉形スラスト動圧軸受において、上記フランジは、上記動圧発生溝が設けられた環状領域よりも径方向内側に軸方向に貫通する少なくとも１つの孔を備えているので、この孔を通して上記フランジの下側の端面とこの面に対向する上記ハウジングの面との間に作動流体を十分に補給できる。したがって、フランジの軸方向の支持を行う動圧を十分に発生させて、起動時にスラスト動圧軸受としての機能を果たすことがで

き、フランジの端面とハウジングの受面の損傷を防止できる。

【００２４】また、請求項２の動圧軸受は、請求項１に記載の動圧軸受において、上記孔の断面積の総和が環状領域の面積の少なくとも１／３０であるので、フランジの下側の端面とこの面に対向する上記ハウジングの面との間に作動流体を十分に補給でき、設定浮上量を確保することができる。

【００２５】また、請求項３の動圧軸受は、請求項１に記載の動圧軸受において、上記フランジの端面に対向するハウジングの受面に、上記環状領域に少なくとも部分的に対向あるいは重なる油溜まりを備えているので、上記フランジの下側の端面とこの面に対向する上記ハウジング

の面との間に作動流体をより確実に補給できる。

【図面の簡単な説明】

【図１】　図１(a)は本発明の一実施の形態に係る動圧軸受の断面図である。図１(b)は、フランジの上側の端面の平面図である。

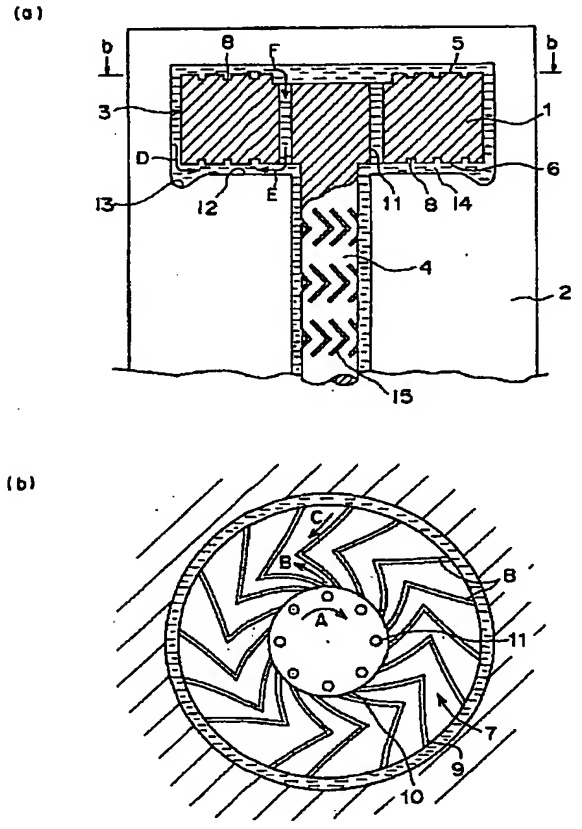
【図２】　図２は孔の総面積と環状領域との比に対する回転体の浮上量を示す。

【符号の説明】

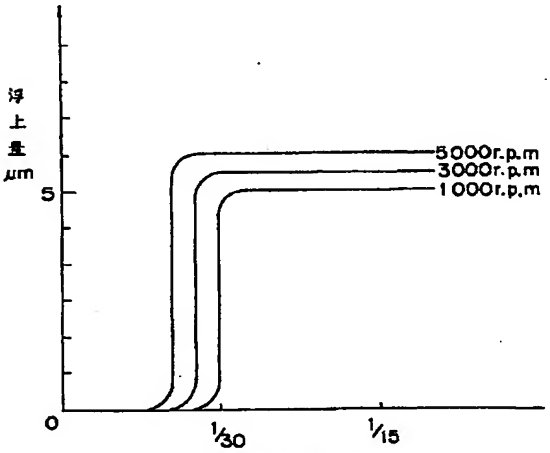
１…フランジ、　２…ハウジング、　３…回転体、　４…軸体、５…フランジの上側の端面、　６…フランジの下側の端面、　７…環状領域、

８…動圧発生溝、　１１…孔、　１２…ハウジングの受面、１３…油溜まり。

【図１】



【図２】



* NOTICES *

Bibliography

---

(19) [Publication country] Japan Patent Office (JP)
(12) [Kind of official gazette] Open patent official report (A)
(11) [Publication No.] JP,10-196643,A
(43) [Date of Publication] July 31, Heisei 10 (1998)
(54) [Title of the Invention] Sealing form thrust hydrodynamic bearing
(51) [International Patent Classification (6th Edition)]

F16C 17/04
17/10

[FI]

F16C 17/04 A
17/10 A

[Request for Examination] Un-asking.
[The number of claims] 3
[Mode of Application] OL
[Number of Pages] 4
(21) [Application number] Japanese Patent Application No. 9-180
(22) [Filing date] January 6, Heisei 9 (1997)
(71) [Applicant]
[Identification Number] 000001247
[Name] Koyo Seiko Co., Ltd.
[Address] 3-5-8, Minami-senba, Chuo-ku, Osaka-shi, Osaka
(72) [Inventor(s)]
[Name] Takahashi **
[Address] 3-5-8, Minami-senba, Chuo-ku, Osaka-shi, Osaka Inside of Koyo Seiko Co., Ltd.
(74) [Attorney]
[Patent Attorney]
[Name] Aoyama ** (besides one person)

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

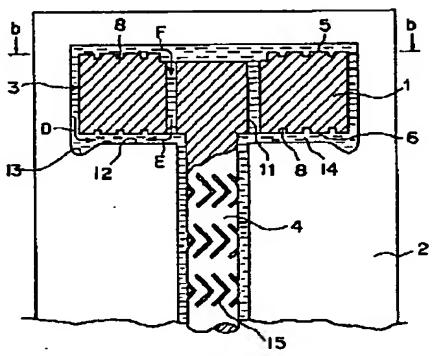
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

Epitome

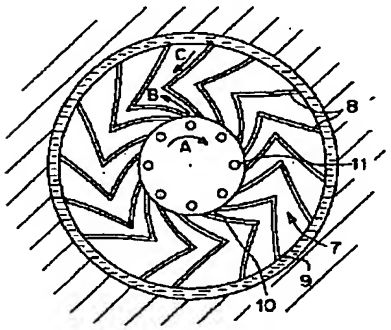
(57) [Abstract]
[Technical problem] The dynamic pressure supported to shaft orientations at the time of starting can fully be generated, and the sealing form thrust hydrodynamic bearing which does not damage an end face etc. is offered.
[Means for Solution] The flange 1 of body of revolution 3 is contained in the state of seal in housing 2. While establishing the dynamic pressure generating slot 8 of V typeface in the vertical both-ends sides 5 and 6 of the above-mentioned flange 1, two or more holes 11 penetrated to shaft orientations at the direction inside of a path are formed in the above-mentioned flange 1 from the dynamic pressure generating slot 8. Moreover, total of the cross section of the above-mentioned hole 11 may be 1/30, even if there is little ring domain 7 area. Furthermore, the sump ball 13 is formed in the abutment 12 of the housing 2 which counters the end face 6 of the above-mentioned flange 1 bottom.

[Translation done.]

(a)



(b)



[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] It has the body of revolution which consists of the flange prepared in the end of an axis and this axis, and housing which contains the flange of this body of revolution in the state of sealing. In the sealing form thrust hydrodynamic bearing by which the dynamic pressure generating slot is established in the abutment of the above-mentioned housing which counters the end face or this end face of the above-mentioned flange the above-mentioned flange The sealing form thrust hydrodynamic bearing characterized by having at least one hole penetrated to shaft orientations at the direction inside of a path rather than the ring domain in which the above-mentioned dynamic pressure generating slot was established.
[Claim 2] The sealing form thrust hydrodynamic bearing to which total of the cross section of the above-mentioned hole is characterized by being [of the above-mentioned ring domain] 1/30 at least in a sealing form thrust hydrodynamic bearing according to claim 1.
[Claim 3] The sealing form thrust hydrodynamic bearing characterized by equipping partially at least the abutment of housing which counters the end face of the above-mentioned flange with opposite or the lapping sump ball in the above-mentioned ring domain in a sealing form thrust hydrodynamic bearing according to claim 1 or 2.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a sealing form thrust hydrodynamic bearing.
[0002]
[Description of the Prior Art] Conventionally, it has the body of revolution which consists of the flange prepared in the end of an axis and this axis as a sealing form thrust hydrodynamic bearing, and housing which contains the flange of this body of revolution in the state of sealing, and there are some which established the dynamic pressure generating slot in the shaft-orientations both-ends side of the above-mentioned flange.
[0003]
[Problem(s) to be Solved by the Invention] By the way, in the above-mentioned conventional sealing form thrust hydrodynamic bearing, when the above-mentioned body of revolution is installed in the direction of a vertical, the above-mentioned body of revolution descends with gravity before starting, and the end face of the flange bottom and the abutment of housing which counters it are in the condition that only the film of the condition which contacted, or a very thin working fluid exists. Although the dynamic pressure generating slot of for example, V typeface tends to draw a working fluid in coincidence in the center of radial of this slot in respect of the shaft-orientations both ends of a flange in this condition if body of revolution is started Since housing has contained the flange in the state of sealing, between the abutment of housing with which negative pressure occurs between the end face of a flange top, and housing, and a little deer working fluid does not exist in it extremely from the first, and the end face of the flange bottom There was a problem that a working fluid could not fully be led especially to the part of the radial inside. Therefore, there was a problem of being in the condition that working fluids ran short between the end face of the flange bottom and the abutment, could not fully generate

the dynamic pressure which supports a flange, and could not achieve the function as a thrust hydrodynamic bearing, and damaging the end face of a flange etc. at the time of starting of body of revolution.
[0004] Then, the purpose of this invention is to offer the sealing form thrust hydrodynamic bearing which can fully generate the dynamic pressure supported to shaft orientations, and does not damage an end face etc. at the time of starting.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the sealing form thrust hydrodynamic bearing of claim 1 It has the body of revolution which consists of the flange prepared in the end of an axis and this axis, and housing which contains the flange of this body of revolution in the state of sealing. In the sealing form thrust hydrodynamic bearing by which the dynamic pressure generating slot is established in the abutment of the above-mentioned housing which counters the end face or this end face of the above-mentioned flange the above-mentioned flange Rather than the ring domain in which the above-mentioned dynamic pressure generating slot was established, the direction inside of a path is equipped with at least one hole penetrated to shaft orientations, and it is characterized by **.
[0006] According to the sealing form thrust hydrodynamic bearing of claim 1, since the shaft of body of revolution is supplied between the end face of the flange bottom, and the abutment of housing through the hole with which the working fluid between the end face of the above-mentioned flange top and the abutment of housing will penetrate the above-mentioned flange if body of revolution rotates in the state of a vertical, enough working fluids for a dynamic pressure generating slot can be supplied. Therefore, the dynamic pressure which supports the shaft orientations of a flange fully occurs, and the function as a thrust hydrodynamic bearing can be achieved, and the end face of the flange bottom and the abutment of housing which counters it are not damaged.
[0007] In the sealing form thrust hydrodynamic bearing according to claim 1, as for the sealing form thrust hydrodynamic bearing of claim 2, total of the cross section of the above-mentioned hole is characterized by being [of the above-mentioned ring domain] 1/30 at least.
[0008] In the sealing form thrust hydrodynamic bearing of claim 2, since total of the cross section of the above-mentioned hole has the above-mentioned ring domain 1/30 at least, working fluids enough at a predetermined engine speed are supplied to the end face of the flange bottom, and sufficient dynamic pressure arises. This was confirmed by the experiment.
[0009] The sealing form thrust hydrodynamic bearing of claim 3 is characterized by equipping partially at least the abutment of housing which counters the end face of the above-mentioned flange with opposite or the lapping sump ball in the above-mentioned ring domain in the sealing form thrust hydrodynamic bearing according to claim 1 or 2.
[0010] According to the sealing form thrust hydrodynamic bearing of claim 3, since the abutment of housing which counters the end face of the above-mentioned flange is partially equipped with opposite or the lapping sump ball at least in the above-mentioned ring domain, supply of the working fluid to the end face of the flange bottom at the time of body-of-revolution starting is performed also from this sump ball, and generating of the dynamic pressure by the dynamic pressure generating slot is ensured.
[0011]
[Embodiment of the Invention] Hereafter, the gestalt of implementation of illustration explains this invention to a detail.
[0012] Drawing 1 (a) is the sectional view of the gestalt of 1 operation of this invention. However, about housing 2, in order to make it legible, hatching is omitted.
[0013] As shown in drawing 1 (a), body of revolution 3 consists of the flange 1 fixed to an axis 4 and its edge. The above-mentioned axis 4 and the flange 1 are supported in a radial and the axial direction with housing 2. The above-mentioned flange 1 is held in housing 2 at the seal condition. As shown in the end faces 5 and 6 of the vertical both sides of the above-mentioned flange 1 at drawing 1 (a) and (b), the dynamic pressure generating slot 8 of V typeface is established in the ring domain 7. This ring domain 7 is a field between a circle 9 and a circle 10 in drawing 1 (b).
[0014] Moreover, eight through tubes 11 are formed at equal intervals on the periphery rather than the ring domain 7 of the above-mentioned flange 1 at the radial inside. Total of the cross section of this through tube 11 has become 1/30 or more [of the area of a ring domain 7].
[0015] On the other hand, two or more sump balls 13 which counter the above-mentioned ring domain 7 partially are formed in the end face 6 of the above-mentioned flange 1 bottom, and the abutment 12 which counters. The

radial inside is curving smoothly so that a working fluid 14 may tend to leave this sump ball 13 in dynamic pressure generating slot side 8.

[0016] On the other hand, the dynamic pressure generating slot 15 is established in the above-mentioned axis 4, and the axis 4 is supported to the radial direction with dynamic pressure.

[0017] When the body of revolution 3 of the sealing form thrust hydrodynamic bearing of the above-mentioned configuration is installed in the direction of a vertical, before starting, the above-mentioned flange 1 descends with a self-weight, and the end face 6 of the flange 1 bottom and the abutment 12 of the housing 2 which counters it will be in the condition that only the film of the condition which contacted, or the very thin working fluid 14 exists. In this condition, if body of revolution 3 is started, the dynamic pressure generating slot 8 of V typeface tends to draw a working fluid 14 in the center of radial of this slot 8. At this time, the space between the end face 5 of a flange 1 top and the abutment 12 of housing 2 and the space between the end face 6 of the flange 1 bottom and the abutment 12 of housing 2 are open for free passage with the hole 11 which penetrates a flange 1 in the direction inside of a path rather than a ring domain 7. Therefore, a working fluid 14 flows, as the arrow heads E and F of drawing 1 (a) show through the above-mentioned hole 11, and a working fluid 14 is supplied between the end face 6 of the flange 1 bottom, and the abutment 12 of housing 2. For this reason, even if housing 2 has contained the flange 1 in the state of sealing, negative pressure does not occur between the end face 8 of a flange 1 top, and housing 2. For this reason, between the abutment 12 of housing 2, and the end face 6 of the flange 1 bottom, as shown in arrow heads D, E, and F, a working fluid 14 can fully be supplied to especially the part of the radial inside, and dynamic pressure can be generated from the time of starting.

[0018] Thus, since a working fluid 14 is fully supplied to the ring domain 7 of the end face 6 of the flange 1 bottom at the time of starting of body of revolution 3, the dynamic pressure which the dynamic pressure generating slot 8 prepares and supports a flange 1 to shaft orientations in the **** ring domain 7 can fully be generated, and the function as a thrust hydrodynamic bearing can be achieved.

[0019] Moreover, the dynamic pressure generating slot 6 of a flange 1 brings in a working fluid 14 from the above-mentioned sump ball 13. That is, at the time of rotation of a flange 1, since the above-mentioned dynamic pressure generating slot 8 brings in a working fluid 14 from the sump ball 13 of dynamic pressure generating slot 8 directly under, as compared with the case where there is no above-mentioned sump ball 13, a working fluid 14 is supplied still more easily between the end face 6 of the flange 1 bottom, and the abutment 12 of housing 2.

[0020] Drawing 2 shows the relation of the flying height of body of revolution 3 to the ratio of total of the area of all the holes 11 for circulating a working fluid 14, and the area of a ring domain 7. In detail, drawing 2 is drawing showing the relation of the flying height of body of revolution 3 to the ratio of the gross area of all the holes 11 for working-fluid 14, and the area of a ring domain 7, when changing the rotational frequency of body of revolution 3 with 1000r.p.m., 3000r.p.m., and 5000r.p.m. When the ratio of the gross area of the above-mentioned hole 11 and the area of a ring domain 7 was 1/30 or more and the rotational frequency of body of revolution 3 changes with 1000r.p.m., 3000r.p.m., and 5000r.p.m., the flying height of body of revolution 3 is set to about 5 micrometers, 5.5 micrometers, and 6 micrometers, respectively, and turns into 5 micrometers or more of setting flying heights. Therefore, the ratio to the total of the area of the hole 11 for working-fluid 14 and the area of a ring domain 7 which penetrate a flange 1 is 1/30 or more, and 5 micrometers or more whose body of revolution 3 is the setting flying height as the rotational frequency of body of revolution 3 is more than 1000r.p.m. can be secured.

[0021] In addition, with the gestalt of the above-mentioned implementation, although the dynamic pressure generating slot 8 is established in the end faces 5 and 6 by the side of the upper and lower sides of a flange 1, it may establish a dynamic pressure generating slot in the abutment of housing which counters the above-mentioned end face.

[0022] Moreover, although a sump ball is not illustrated, it may be formed in the end face of this flange. You may make it this sump ball counter a ring domain with a dynamic pressure generating slot, or it may lap with this ring domain partially. Moreover, with the gestalt of operation, although two or more sump balls 13 are formed in the periphery part of the abutment 12 of housing 2, they may be formed in the inner circumference part of a housing abutment. Moreover, the configuration of a sump ball may be a round hole, a radii form, or a ring form.

[0023]

[Effect of the Invention] So that clearly as mentioned above, the hydrodynamic bearing of claim 1 It has the body of revolution which consists of the flange prepared in the end of an axis and this axis, and housing which contains the flange of this body of revolution in the state of sealing. In the sealing form thrust hydrodynamic bearing by which the dynamic pressure generating slot is established in the abutment of the above-mentioned

housing which counters the end face or this end face of the above-mentioned flange the above-mentioned flange Since the direction inside of a path is equipped with at least one hole penetrated to shaft orientations rather than the ring domain in which the above-mentioned dynamic pressure generating slot was established, a working fluid can fully be supplied through this hole between the end face of the above-mentioned flange bottom, and the field of the above-mentioned housing which counters this field. Therefore, the dynamic pressure which supports the shaft orientations of a flange can fully be generated, the function as a thrust hydrodynamic bearing can be achieved at the time of starting, and damage on the end face of a flange and the abutment of housing can be prevented.

[0024] Moreover, in a hydrodynamic bearing according to claim 1, since the area of a ring domain is 1/30 at least, total of the cross-sectional area of the above-mentioned hole can fully supply a working fluid between the end face of the flange bottom, and the field of the above-mentioned housing which counters this field, and the hydrodynamic bearing of claim 2 can secure the setting flying height.

[0025] Moreover, in a hydrodynamic bearing according to claim 1, since the hydrodynamic bearing of claim 3 equips the above-mentioned ring domain with opposite or the lapping sump ball partially at least in the abutment of housing which counters the end face of the above-mentioned flange, it can supply a working fluid more certainly between the end face of the above-mentioned flange bottom, and the field of the above-mentioned housing which counters in this field.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 (a) is the sectional view of the hydrodynamic bearing concerning the gestalt of 1 operation of this invention. Drawing 1 (b) is the top view of the end face of a flange top.

[Drawing 2] Drawing 2 shows the flying height of body of revolution to the ratio of the gross area of a hole, and a ring domain.

[Description of Notations]

1 — Flange 2 — Housing 3 — Body of revolution 4 [6 — End face of the flange bottom 7 — Ring domain,] — An axis, 5 — End face of a flange top
8 — Dynamic pressure generating slot 11 — Hole 12 — The abutment of housing, 13 — Sump ball.

[Translation done.]

* NOTICES *

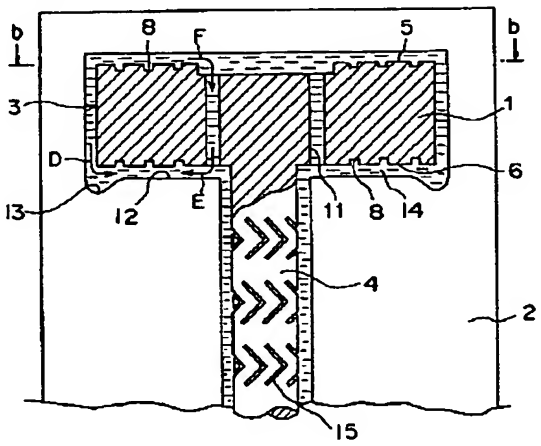
JPO and NCIPI are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

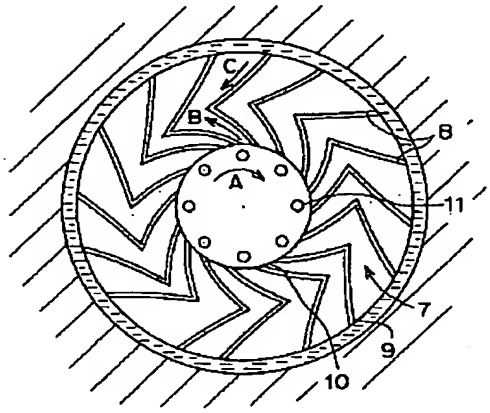
DRAWINGS

[Drawing 1]

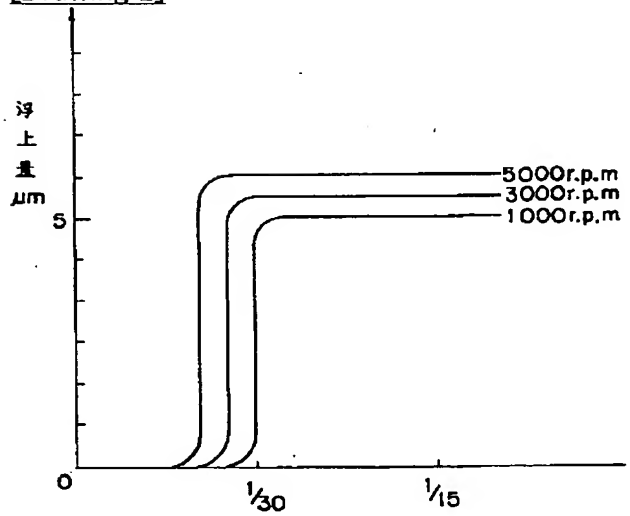
(a)



(b)



[Drawing 2]



[Translation done.]